SYSTEM FOR DISPENSING A SUBSTANCE

The invention relates to a system for dispensing a substance, comprising a compressible container for a stock of substance that is to be dispensed, which container has an outlet member for dispensing substance from the container, and also comprising a dispensing device for the metered dispensing of substance from the container.

It is an object of the invention to provide an improved system. In particular, it is an object of the invention to provide a system which, for example when used in the catering industry for dispensing an edible sauce or the like, takes up little space in the kitchen. Moreover, it is an object of the invention to provide a system which is very easy to operate.

The invention provides a system for dispensing a substance, comprising:

- a compressible container for a stock of substance that is to be dispensed, which container has an outlet member for dispensing substance from the container,
- a dispensing device for the metered dispensing of substance from the container, which device comprises:
  - a housing having a chamber for accommodating a compressible container, which chamber has a substantially vertically extending peripheral wall and an opening at the top side for placing the container into the chamber from above,
  - a counter-supporting member for the top side of the container, which counter-supporting member can be placed over the opening at the top side of the chamber after the container has been placed into the chamber,
  - a displaceable pressure-exerting member which extends as a base which can be moved up and

down in the chamber and is designed to act on the container placed in the chamber,

- drive means for the pressure-exerting member, such that the substance is dispensed from the container through compression of the container between the counter-supporting member and the pressure-exerting member moving upwards in the direction of the counter-supporting member.

This system makes it possible for the compressible container, which in a preferred embodiment is designed as a pouch, to be placed in the associated chamber in the housing from above. The counter-supporting member, which is preferably designed as a lid, can then be fitted and substance can be dispensed. In the process, the pressure-exerting member moves upwards.

Preferably, the system comprises a dispensing passage member which forms a dispensing passage for the substance, the dispensing passage member being provided in the vicinity of the top side of the chamber of the dispensing device, and the dispensing passage preferably forming a downwardly facing dispensing mouthpiece. The dispensing passage member may be an integral component of the compressible container, for example a hose-like element.

In an advantageous embodiment, the dispensing passage member is a loose component which can be coupled to the outlet member of the container. This arrangement is preferably designed in such a manner that the coupling is unbreakable, which means that after the pouch has been emptied under the application of pressure the dispensing passage member also has to be disposed of. This is advantageous from a food hygiene perspective.

Preferably, the dispensing device is provided with fixing means for fixing the dispensing passage member, which has already been coupled to the container, with

respect to the housing.

Further advantageous embodiments of the system according to the invention are described in the claims and in the following description with reference to the drawing, in which:

Fig. 1 diagrammatically depicts a side view of a preferred embodiment of the dispensing device of the system according to the invention,

Fig. 2 shows a plan view of the dispensing device from Figure 1 with the lid removed,

Figs. 3-5 show the same view as in Figure 1, with the container having been emptied to an ever increasing extent,

Fig. 6 shows a detail of the dispensing device and associated compressible container,

Fig. 7 shows a detail of the dispensing system,

Fig. 8 shows a side view of drive means of a preferred embodiment of the device according to the invention,

Fig. 9 shows a cross section through a preferred embodiment of a dispensing device according to the invention,

Fig. 10 shows an embodiment of compression means for compressing a dispensing passage member,

Fig. 11 shows another embodiment of compression means for compressing a dispensing passage member, and

Fig. 12 shows a plan view of the dispensing device shown in Figure 1, with the lid removed.

Figures 1-5 show a dispensing device 1 for the metered dispensing of substance from a compressible container 2 for a stock of substance that is to be dispensed. The container has been omitted from Figures 1-5 for the sake of clarity.

The container is preferably a (plastic) pouch 2, as partially shown in Figure 6, provided with an outlet member 3. However, the container could also be a container with a dimensionally stable, deformable wall,

such as for example a type of PET bottle. The outlet member 3 shown is of a generally known type, as marketed, for example, by Asept in Sweden. This outlet member 3 is arranged on the inner side of the pouch 2 and is substantially annular with an insertion opening 4 for a dispensing passage member 5.

As is known from Asept, it is preferable for the pouch wall to be punctured during coupling of the dispensing passage member 5 and the outlet member 3, or if appropriate only in a second operation after the coupling operation.

At one end, the dispensing passage member 5 preferably comprises a part which punctures the pouch and is made from hard plastic, as well as an adjoining part which at the other end opens to the outside and is made from flexible plastic. It is preferable for these two parts to be made from a single piece of plastic, in which case the different properties of the said parts are obtained by, for example, optionally rapid cooling of the relevant part of the dispensing passage member 5 or in some other way.

The coupling between outlet member 3 and dispensing passage member 5 is preferably permanent, so that the coupling cannot be released again. This means that the dispensing passage member 5 has to be disposed of together with the pouch 2.

The device 1 has a housing 10 with a chamber 11 for accommodating a compressible container 2. The chamber 11 has a substantially vertically extending peripheral wall 12 and an opening 13 at the top side for the container 2 to be placed in the chamber 11 from above.

When using a separate dispensing passage member 5, it is preferable for the said member 5 to be coupled to the pouch 2 in advance and for the unit formed in this

way to be placed into the device 1. In a variant which is not shown, it is provided that the user first of all fixes the loose dispensing passage member with respect to the housing and then couples the container to the dispensing passage member.

In yet another variant, the dispensing passage member is incorporated integrally in the dispensing device, for example as part of the housing.

In another possible embodiment of the container 2, the dispensing passage member 5 may be formed integrally with the outlet member 3. In this case, during use the container 2 is placed in the device 1 together with the dispensing passage member 5 and is then disposed of after use. In an embodiment of this type, the dispensing passage member 5 is closed off in a suitably sealed way.

The device 1 has a counter-supporting member 15 for the top side of pouch 2, which is in this case designed as a hinged lid with an associated locking means 16 for locking the lid 15 in the closed position.

After the pouch 2 with member 5 has been placed in the device 1, the lid 15 is fitted over the opening 13 at the top side of the chamber 10 and locked.

The housing 10 has a foot 17, by means of which the housing 10 can be placed on a supporting surface.

Furthermore, the device 1 has a displaceable pressure-exerting member 18 which extends as a base that can be displaced up and down in the chamber 11 and is designed to act on the pouch 2 which has been placed in the chamber 11.

To move the pressure-exerting member 18 upwards under a pressure-exerting force, drive means 20 are provided,

in such a manner that the substance is dispensed from the pouch 2 through compression of the pouch 2 between the lid 15 and the pressure-exerting member 18 moving upwards in the direction of the lid 15.

Before closing the lid 15, the dispensing passage member 5 is brought into engagement with fixing means 21, in this case the slot 22, so that the dispensing passage member 5 and the outlet member 3 are at the correct position.

As can be seen in the drawing, the dispensing passage member 5 is preferably located in the vicinity of the top side of the chamber 11 of the dispensing device 1. The dispensing passage 6 preferably has a dispensing mouthpiece facing downwards.

It is clearly apparent from Figure 2 that the housing 10, next to the chamber 11 for accommodating the pouch 2, has a vertical chamber 25 for accommodating a drive mechanism 20 which is connected to the pressure-exerting member 18.

The peripheral wall of the chamber 11 is provided with a vertical slot 26 which forms a passage to the other chamber 25, the pressure-exerting member 18 having a connecting element 27 which extends through the said slot 26 into the other chamber 25 and thereby connects the pressure-exerting member to the drive means 20.

In a preferred embodiment, there are sealing means for sealing off the passage slots 26, in such a manner that the pouch 2 does not move into the passage slots 26 as it is compressed. By way of example, for this purpose there are brushes 29 (Fig. 12) or another stationary element, for example a stationary sealing tape, which can be deformed in such a manner that it can engage around the connecting element 27 and can seal off the slot. Another possible option is a sealing tape 28

(Fig. 2) which moves with the pressure-exerting member 18 and seals off the slot in the region above the pressure-exerting member 18 to prevent the pouch 2 from moving into the slot.

In the embodiment shown, the drive means comprise a manually driven mechanism, but other solutions, such as those using an electric drive, are of course also possible.

The drive means 20 in this case comprise an actuating handle 30 which can be pivoted through an angle range, in such a manner that each actuating movement dispenses a portion of substance as a result of the pressure-exerting member 18 being moved a certain distance upwards so as to compress the pouch 2 further.

In one possible embodiment, the housing has a stationary pivot bearing for the actuating handle, preferably in the vicinity of the top side of the housing.

In the embodiment shown, the actuating handle 30 has an associated pivot bearing 31 which is guided in a vertically moveable manner in a guide feature 32 with respect to the housing 10, in such a manner that as a result of actuation of the pivot handle 30 the pivot bearing 31 is in each case displaced a distance upwards with respect to the housing. This can be seen from Figures 1,3-5.

The transmission mechanism between the handle 30 and the pressure-exerting member 18 can be designed in a wide range of ways. One possible solution is a threaded spindle which is rotated in steps through actuation of the handle 30, a spindle nut member being connected to the pressure-exerting member.

Another possible design has a rod 34, a carrier 35 for

the pressure-exerting member 18 which can slide along the rod and a quick-action displacement and clamping mechanism (with clamping lug 36) which engages on the rod, as is known, for example, from US 4 926 722 (Quick-Grip). A mechanism of this type can also be designed "double" in order to achieve a stationary setting of the manual actuation member, for example a pivot handle. In this case, two rods would be provided, one coupled directly to the manual actuation member and, via a freewheeling coupling, to the component which climbs upwards along the other rod.

One possible embodiment of the drive means having the "double" system is shown by way of example in Fig. 8. In the figure, in accordance with what has been described above, the pressure-exerting member is denoted by reference numeral 18 and the actuating handle is denoted by 30. The drive means 79 of the "double" system comprise a drawing rod 81 which can move to and fro in the axial direction and a stationary rod 82 arranged parallel to the drawing rod. The pressure-exerting member 18 is coupled to a carrier 80. A tilting plate 83 with a passage bore for the rod 81 is arranged around the drawing rod 81. At an end region, the top side of the tilting plate 83 is placed against a supporting pin 84 secured to the carrier 80. The underside of the other end region of the tilting plate 83 is supported by a spring 85, which in turn is supported on a supporting member 86 which is fixedly connected to the carrier 80. A tilting plate 87 with a passage bore for the rod 82 is arranged around the stationary rod 82. The top side of an end region of the tilting plate 87 is placed against a spring 89 which is secured to the carrier 80 and is connected to a supporting pin 88. The underside of the other end region of the tilting plate 87 is supported by a spring 91, which in turn is supported on a supporting member 92 which is fixedly connected to the carrier 80. Furthermore, there is a stop member 90 which limits the

movement of the tilting plate 87 by the spring 89.

The handle 30 is connected to the stationary rod 82 by means of a pivot bearing 94, but could also be connected to another stationary component of the device 1. Via a reversing mechanism 93 which comprises a lever 95, a pivoting movement of the handle 30 is converted into an axial movement of the drawing rod 81. When the handle 30 pivots downwards (in the clockwise direction in the figure), the drawing rod 81 moves upwards, and when the handle 30 pivots upwards (in the anticlockwise direction in the figure), the drawing rod 81 moves downwards.

During use, the handle 30 will be pivoted downwards and therefore the drawing rod 81 will be moved upwards. The tilting plate 83 then adopts an oblique position and tilts about the drawing rod 81, with the result that the carrier 80 is coupled to the drawing rod 81 and moves upwards with it. Then, the handle 30 is pivoted back into an at-rest position, with the result that the drawing rod 81 is moved downwards. The handle 30 could be made to pivot back, for example, by means of a restoring spring 96, as shown in the figure. The tilting plate 83 is also moved downwards by the movement of the drawing rod 81, with the result that the tilting plate 83 will tilt with respect to the drawing rod 81, i.e. adopts a less oblique position with respect to the rod 81. As a result, the tilting plate 83, and therefore the carrier 80, is decoupled from the drawing rod 81. Therefore, the carrier 80 will not also be pulled downwards by the drawing rod 81.

When the carrier 80 moves upwards, the other tilting plate 87 is tilted towards a less oblique position and is decoupled from the carrier 80. Therefore, the carrier 80 can move freely upwards with respect to the stationary rod 82. When the carrier 80 comes to a stop at the end of the upwards movement of the drawing rod

81, the tilting plate 87 adopts a more oblique position with respect to the stationary rod, so that the carrier 80 is coupled to the stationary rod. Therefore, the carrier 80 is only connected to the drawing rod 81 and decoupled from the stationary rod 82 during the upwards movement of the drawing rod 81.

The spring 89 which is arranged between the supporting point 88 and the tilting plate 87 ensures that the carrier 80, when it comes to a stop after an upwards movement and is decoupled from the drawing rod 81, can drop a predetermined, small distance downwards, so that the pressure on the container 2 which is being compressed by the pressure-exerting member 18 is reduced and is preferably eliminated altogether. This movement is also referred to as "backdrop" and prevents liquid from continuing to flow out of the container 2 when the upwards movement of the drawing rod 81 has been completed. This allows an accurately measured quantity to be dispensed per movement of the handle 30, allowing good metering of sauce, for example.

It is also possible to use an embodiment in which there is no spring 89, but rather the second tilting plate 87 is formed in such a manner that it is coupled to the stationary rod-like element 82 at a defined minimum tilting angle of the tilting plate 87 with respect to the stationary rod-like element 82. In particular, the passage bore in the tilting plate is formed and dimensioned in such a manner that the minimum tilting angle is reached when the carrier 80 has dropped a certain distance downwards and the load on the container 2 has been at least partially relieved.

As another alternative, it would be possible to provide a chain mechanism with two wheels which are positioned one above the other and around which a chain loop runs. The pressure-exerting member 18 is then connected to the chain. Driving one of the wheels in steps then

causes the said pressure-exerting member to be moved upwards in steps.

It is preferable to provide a valve, preferably a self-closing valve, for closing off the dispensing passage 6. If the dispensing passage member 5 is a flexible hose-like element, as in Figure 7, it is possible to provide a squeezing-shut means 40 for locally squeezing the flexible hose-like element shut, for example a squeezing-shut means 41 which is placed under spring pressure.

As an alternative, it is possible to fit an actively actuable valve. The actively actuable valve is coupled to the drive means 20, 79 and is opened at the moment at which the pressure-exerting mechanism is actuated. As a result, the valve is already open when the container 2 is placed under pressure. This has the advantage over the self-closing valve described above with reference to Fig. 7 that the device can even be used to dispense a sauce which contains solid constituents as well as a liquid constituent. With a self-closing valve as shown in Fig. 7, the solid constituents would be retained by the valve and only the liquid fraction of the sauce would be dispensed.

To prevent the possibility of the actively actuated valve being held open while the container 2 is under pressure, it is possible for the actively actuated valve to be closed by a preferably mechanical timing mechanism. The timing mechanism ensures that the valve can only remain open for a preset time. This allows accurate metering of sauce.

It is also possible for the actively actuated valve to be closed by a threshold mechanism which is activated when a mechanical or electronic threshold at the end of the movement of the drive means is exceeded. This too allows accurate metering.

To achieve optimum emptying of the pouch 2, there is provision for the lid 15 to have a wall surface 41 which faces the pressure-exerting member 18 (cf. Figure 6) and is substantially complementary to the opposite surface of the pressure-exerting member 18, in such a manner that the outlet member 3 of the pouch 2, as seen in the direction in which pressure is exerted, is recessed with respect to the sidewall surface 41 of the lid 15, so that the pouch 2 can be emptied to the maximum possible extent.

This latter aspect is also advantageous for other configurations in which a pouch 2 with outlet member 3 is emptied by a pressure-exerting member. In a device of this type, a wall is then provided with a recess for accommodating the outlet member, so that the surrounding wall surface is complementary to the associated surface of the pressure-exerting member.

To achieve optimum emptying of the container 2, the pressure-exerting member may advantageously be formed as shown in cross section in Fig. 9. The pressure-exerting member 118 shown in Fig. 9 has an engagement surface 119 and a groove 120 located around it. The groove 120 is used to accommodate container material which becomes wrinkled during compression, as indicated at 121 in the figure.

To prevent the container 2 from folding up in the centre rather than at the pressure-exerting member 118 under the influence of the compressive force, it is possible to make the inner side of the wall 12 suitably rough, so that wrinkling of the container 2 is counteracted by the friction between the container 2 and the wall 12, except for at the location of the pressure-exerting member 118.

It is preferable for the device to include compression

means for deforming the dispensing passage in such a manner that the substance in the dispensing passage is pressed outwards. The compression means comprise, for example, as shown in Fig. 10, a compression member 100 which is designed to compress the dispensing passage 101 at a defined compression region, indicated by 102, during dispensing of substance and to displace the compression region 102 along the dispensing passage 101 in the direction of the dispensing mouthpiece 103. 105 denotes a supporting element for the dispensing passage 101. A compression member 100 may, for example, be one or more rollers or cams which press on the dispensing passage and are rolled or slid along the dispensing passage towards the dispensing mouthpiece. The rollers or cams may be secured to a belt or chain 104 as indicated by way of example in Fig. 10. The chain or belt 104 can be driven by drive means, which are preferably coupled to the drive means of the pressure-exerting member for compressing the container.

In the figure, there are two rollers 100, but there could of course be more rollers, so that a type of wave motion or a peristaltic motion is produced in the dispensing passage 101. According to a possible variant embodiment, the compression means may also comprise a peristaltic vane pump, in which case the vanes serve as compression member and are driven by a worm wheel. The vanes compress the dispensing passage one by one in succession, so that the substance is forced towards the dispensing mouthpiece.

In an alternative embodiment of the compression means, the passage 101 can be compressed ever closer towards the dispensing mouthpiece 103 from one side by means of pressure-exerting elements 110 and 111 as shown in Fig. 11. These elements may, for example, be pressure-exerting plates. The pressure-exerting element 110 is stationary and serves to support the dispensing passage 101. The pressure-exerting element 111 is secured

pivotably and can be pivoted in the direction of the pressure-exerting element 110, so that the dispensing passage is compressed ever further towards the dispensing mouthpiece 103 between the two pressure-exerting elements 110, 111.

The compression means are particularly advantageous if a viscous substance is to be dispensed from the container, in which case simply applying a pressure to the container alone will not be sufficient for satisfactory dispensing of the substance. Moreover, the compression means can also be used in dispensing devices other than the dispensing device disclosed in the figures and the description.